



Wind – Power Literally from Thin Air

Presentation to FRP Institute

**On
8th May 2021**

Introduction



- **Use of Wind Power is time immemorial – Grinding flour to Pumping Water**
- **Rotation of Blades connected to a gear train of Gear Box and generator converts Kinetic Energy to Electric Energy**
- **Wind turbine is an Engineering Marvel – to work in difficult and complex terrain**
- **Wind Power is intermittent & seasonal -- However, there are techniques for Forecasting and Scheduling**
- **It is a great device for future proofing power cost – No fuel**
- **Natures Gift to combat Climate Change and Global Warming**

World Statistics – 4 Top countries



- **China** – Wind potential of 3000 GW – Installed 288 GW - 52 GW in 2020 alone and 10 GW of offshore.
- **United States** – Potential of 10,000 GW – Installed 122 GW – added 17 GW in 2020
- **Germany** – Installed 63 GW – 55 GW onshore and 8 GW offshore – Aims to supply 65% of total power consumption thro' Wind Power by 2030
- **India** – Onshore Wind Power Potential of +600 GW at hub height of 120 mtr. – Installed so far 40 GW onshore . Offshore potential of 70 GW mainly in Tamil Nadu and Gujarat – No installation so far

India : Current Status



- **Government has set an ambitious target of 60 GW by 2022 and 140 GW by 2030**
- **Almost all wind power investment is from private sector**
- **Totally benign and non-polluting source with 'zero' water usage.**
- **Positive impact on Rural Economy – Employment opportunity for skilled labour from sons of the soil – More than 1 Million**
- **Manufacturing capacity of 10 GW p.a. with 70 to 80% localization – Make in India / Atmanirbhar Bharat**
- **Agriculture and Horticulture can co-exist with Wind Power**
- **Land usage on foot print basis**

Indian RE Scenario



	(In GW)		
	2021*	2022**	2030**
Wind	39.24	60.00	140.00
Solar	40.09	100.00	280.00
Biomass	10.31	10.00	10.00
Small Hydro	4.79	5.00	5.00
Others	--	--	15.00
Total	94.43	175.00	450.00

Current Total Power Generation 350 GW
Projected Power Generation 800 GW by 2030

* Actual

** Projection

Technology



- **Beginning with 250 KW turbine at 30 mtr. hub height and today it is 3.5 MW turbine with 150 mtr. hub height / 150 mtr. Rotor**
- **India can boast of state-of-the-art technology – 16 manufacturing companies with over 60 models -- 6 internationally recognized R&D centres both for turbine and blade technology.**
- **Technology of both Gear and Gearless Turbines – Certified under IECRE standards**
- **Blade size and design plays a major role in increasing generation and lowering Levelized Cost of Energy (LCOE)**
- **Custom made design under same MW platform**

Business Case India – Status & Issues



- **10 GW year on year addition to meet Government target of 140 GW by 2030 – Industry fully geared.**
- **This translates to 40,000 Turbines or 120,000 Blades (Average Turbine size of 2.5 MW) – 40,000 Nacelle cover**
- **Specialty glass fabric and carbon pultruded rods are being imported**
- **Current model of procurement is restricted to competitive bidding thro' Solar Energy Corporation of India (SECI)**
- **Power a concurrent subject – DISCOMs demand for unviable tariff**
- **Procurement price far below the Average Procurement Pool Cost (APPC)**
- **Capacity addition of mere 1.5 GW average per annum in the last 4 years**



Possible Solutions

- **Feed-in-Tariff (FiT) or National Tariff to accelerate growth – eg. China and United States**
- **Strict compliance / mandating of RPO**
- **ISTS (Interstate Transmission) waiver up to 2030**
- **Opportunity for Retail investment – Below 25 MW – Bid size 50 MW (SECI)**
- **Wheeling & Annual Banking facility for captive / group captive**
- **Open Access for Interstate Transaction for RPO entities / Bilateral trade**
- **Enabling policy to boost exports – mitigate issues of high interest cost and logistics (freight) cost**



Future

- **Lighter and longer blades to enhance energy**
- **Recycling Policy on Steel and Fiber glass - End of life solution**
- **Transportation solution for longer blades**
- **Split blades – Moulding / Joining at site**
- **Storage Technology – Lithium Ion / Hydrogen**
- **Infrastructure for offshore – Port facility -- connectivity**
- **Training of manpower at different levels**
- **Micro Grids – a combination of wind / solar with storage to meet corporate / township requirement**



“Wind – Power Literally from Thin Air”

**Nature’s gift to combat Climate Change and
Global Warming**

**Positive Impact on all counts and
I close with the song**

“The Answer my friend is Blowing in the Wind”